

ABSTRACT

[0080] Embodiments of the present invention provide a pixel cell for an image sensor that includes a photodiode, which provides high gain, low noise, and low dark current. The pixel cell includes a photodiode comprising layers of a first material and at least a second material in contact with one another. The photodiode generates charge in response to light and also amplifies the charge. The layers may be configured to promote impact ionization by a first carrier type and suppress impact ionization by a second carrier type. The pixel cell also includes a gate of a transistor adjacent to the photodiode and may include readout circuitry for reading out the charge generated and amplified by the photodiode.